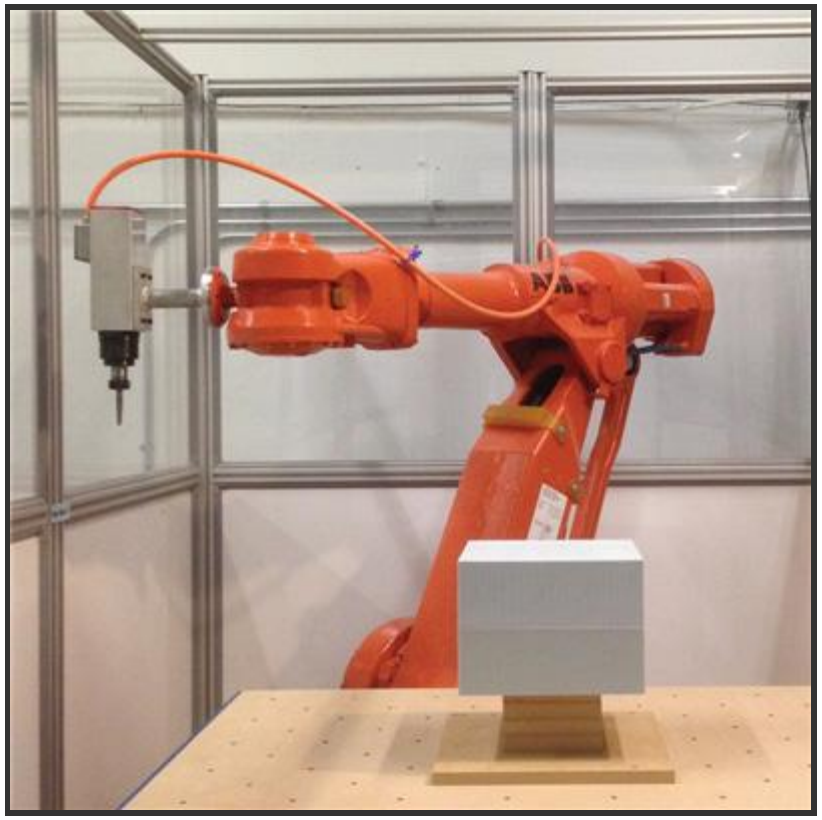
savsu®

RhinoCAM & IRBCAM at Savsu Technologies

Gordon Barnard is a Designer + Engineer for Savsu Technologies, a medical technology design company specializing in the Cold Chain industry.

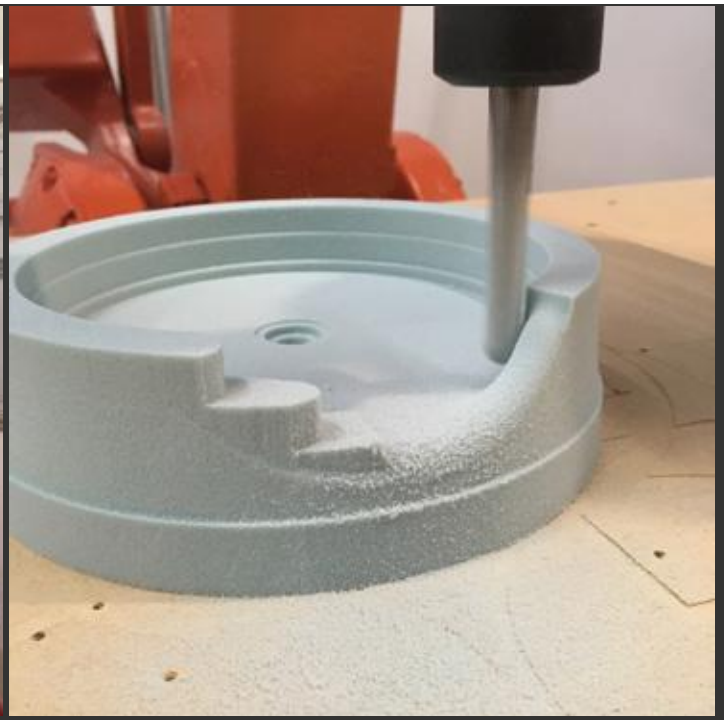
Cold Chain refers to the technology for keeping a payload at a specific temperature range. Savsu also designs and manufactures custom solutions for customers who ship live cells, vaccines, etc. used in biotechnology and precision medicine applications.

Savsu's smart packaging systems incorporates GPS, temperature monitoring and other electronics into their transportation packaging designs.



The RhinoCAM / IRBCAM Difference

In Savsu's Albuquerque, NM facility, Gordon uses RhinoCAM and IRBCAM to program their ABB 4400, 6 Axis robot for the production of rapid prototype components in their made to order smart packaging systems. In the example shown below, Gordon is able to go from 3D CAD to CAM to Robot to thermoformed prototype in just a couple of hours! This means that Savsu engineers can have a design review in the morning and physical prototypes for testing in the afternoon! That's Rapid Prototyping at its finest!



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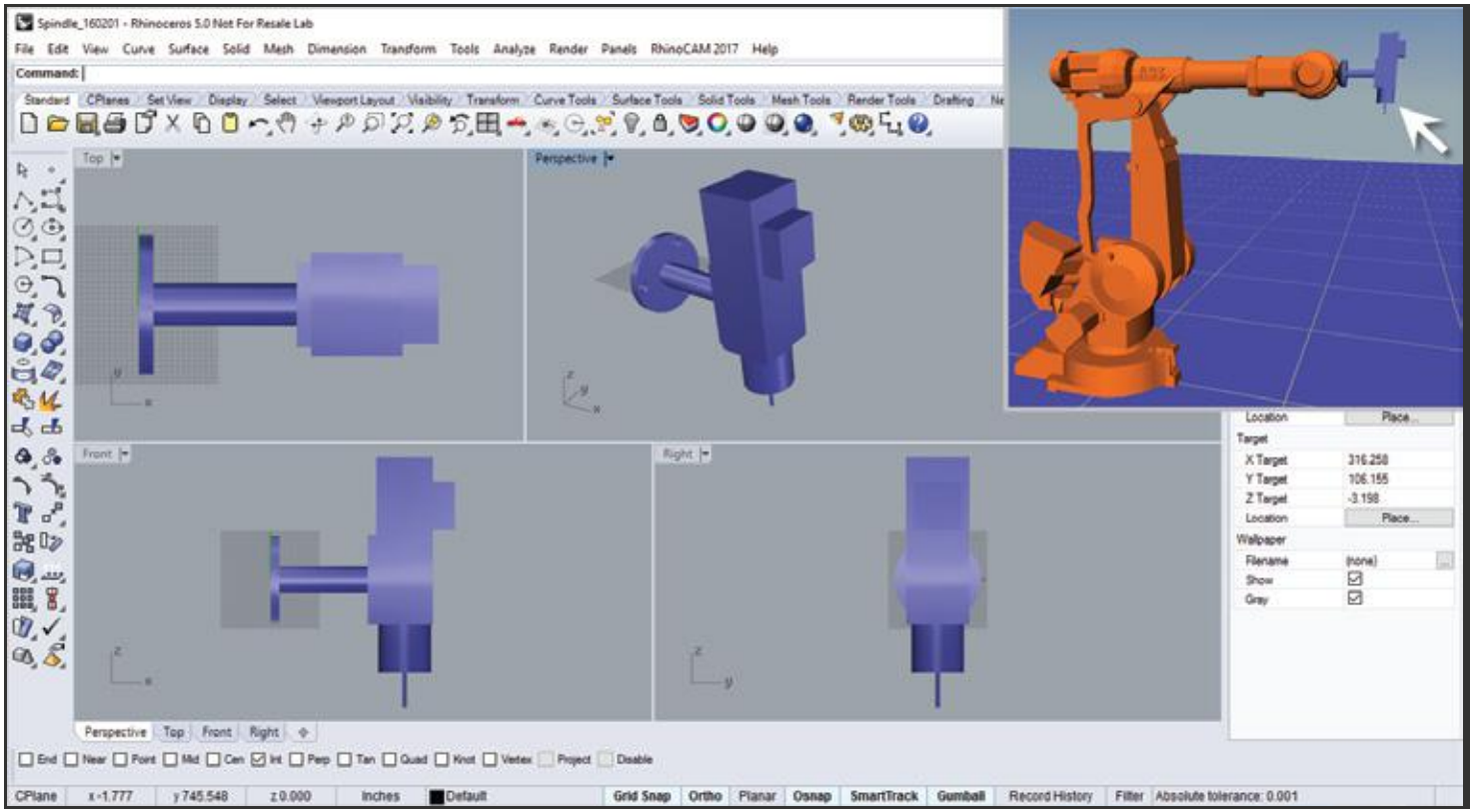
The Spindle & the Bot

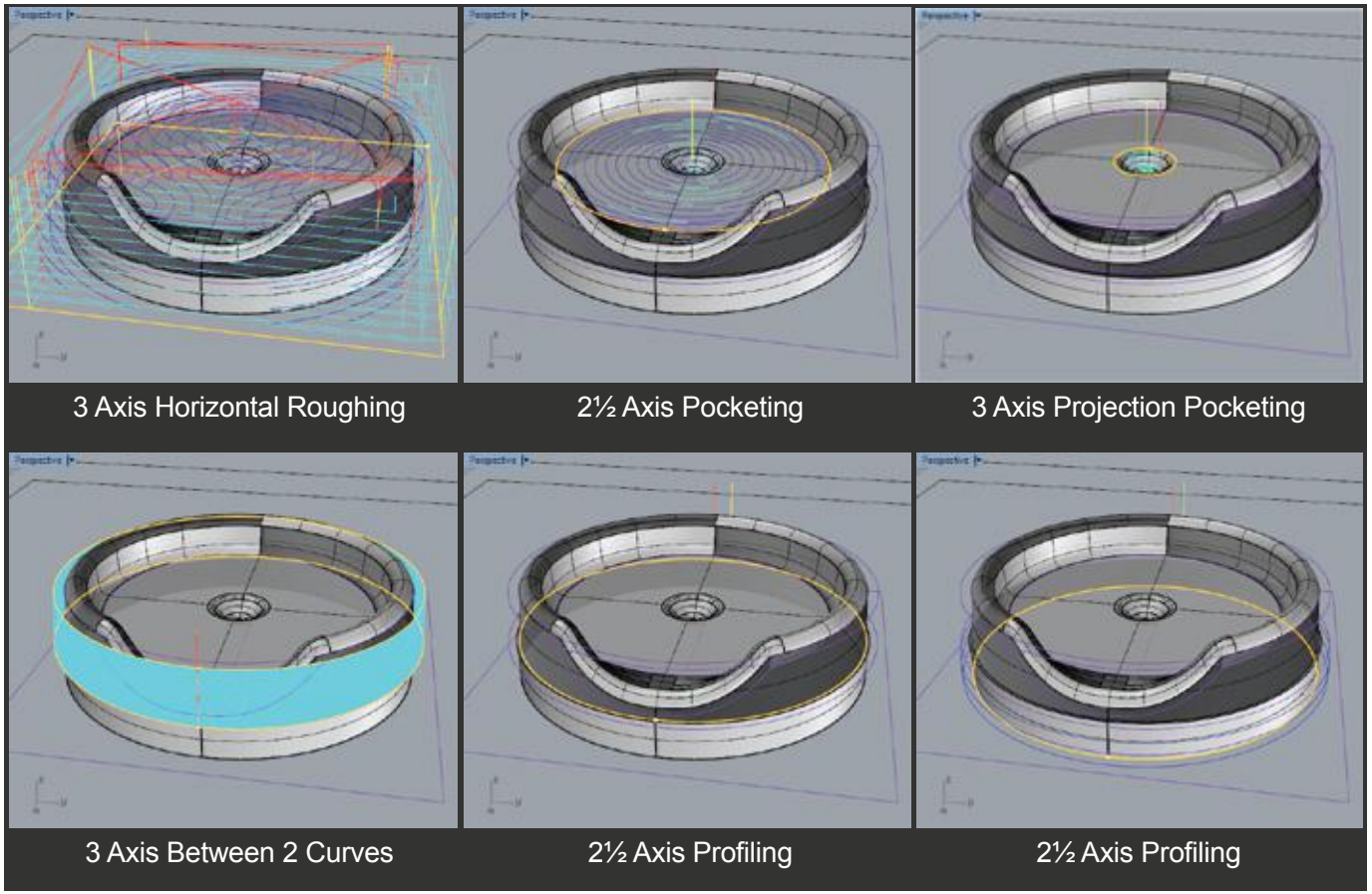
IRBCAM supports over 250 robot models and configurations. You can also define your own spindle by modeling it in Rhino and saving it as an STL file. IRBCAM then adds the spindle to their library. Also, IRBCAM's station setup wizard makes it easy to define your unique robot station. In the image below we see one of Savsu Technologies spindles that Gordon's has modeled in Rhino and displayed in IRBCAM's robot station.



In the main image, we see one of Savsu Technologies spindles that Gordon has modeled in Rhino. Inset Top Right we see the spindle displayed in IRBCAM's robot station. This is a one-time setup.

The RhinoCAM Toolpaths

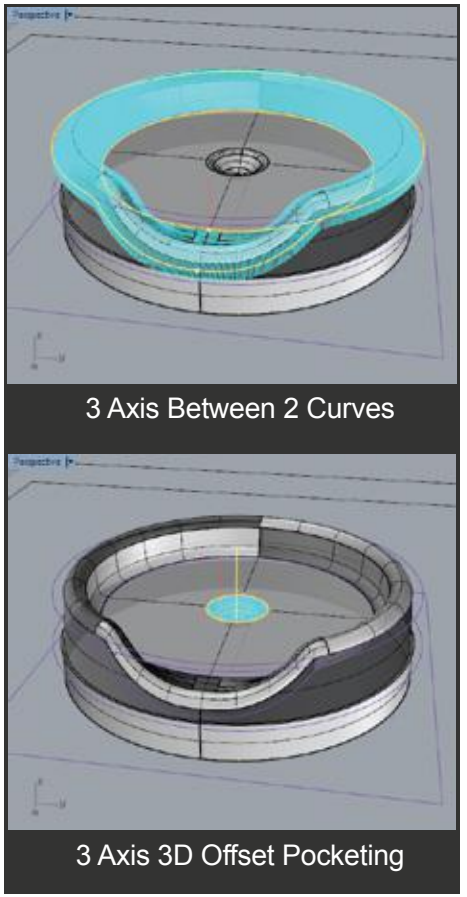
In the example project shown below we see the part designed in Rhino and 2½ & 3 Axis toolpaths created in RhinoCAM. Gordon has created two setups, one for each tool that he plans to use for this part. Here are the toolpaths in Setup 1 that Gordon has programmed using a 12.7 (½") endmill:



3 Axis Horizontal Roughing | 2½ Axis Pocketing | 3 Axis Projection Pocketing

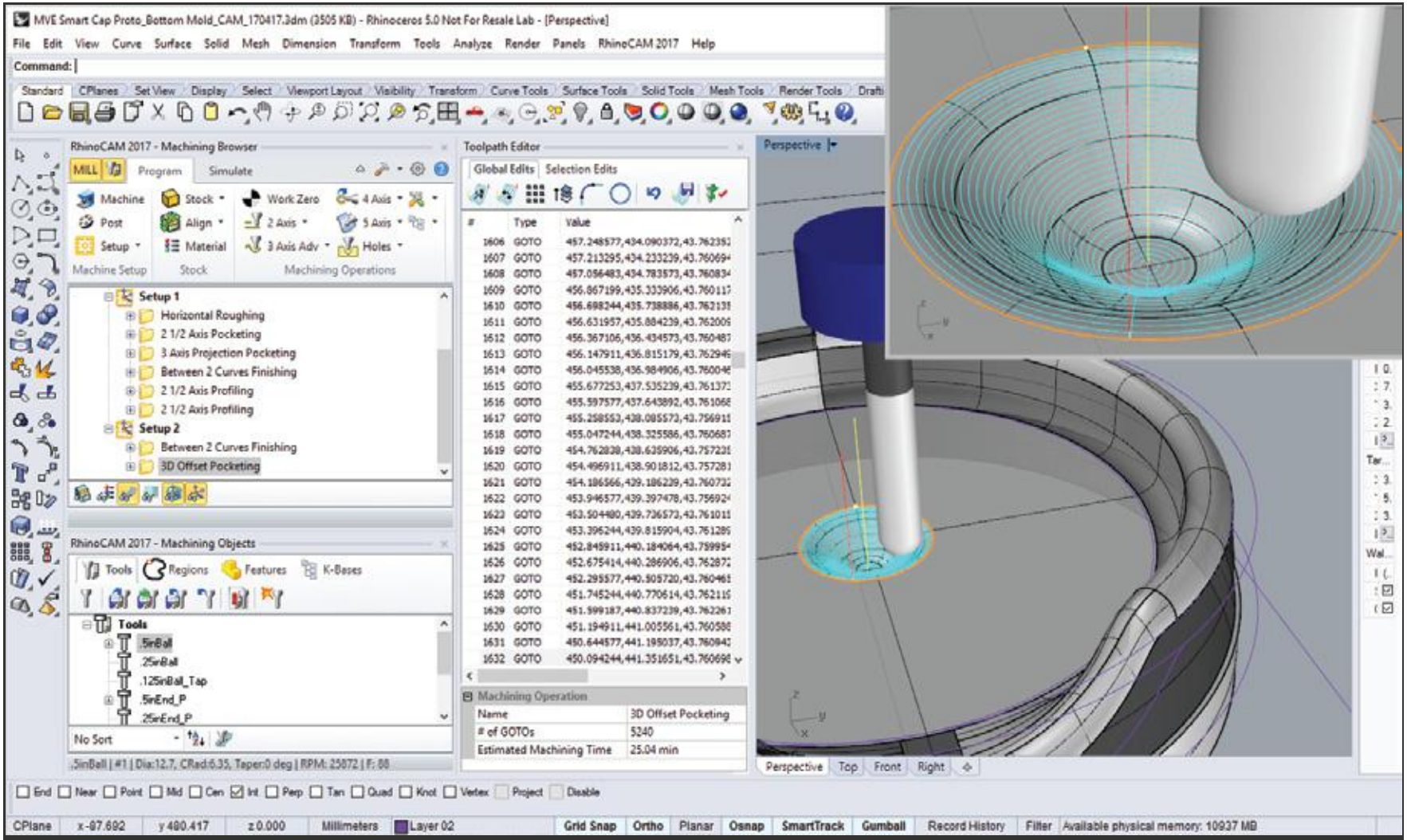
3 Axis Between 2 Curves | 2½ Axis Profiling | 2½ Axis Profiling

Here are the toolpaths in Setup 2 that Gordon has programmed using a 12.7 (½") ball mill:



3 Axis Between 2 Curves

3 Axis 3D Offset Pocketing

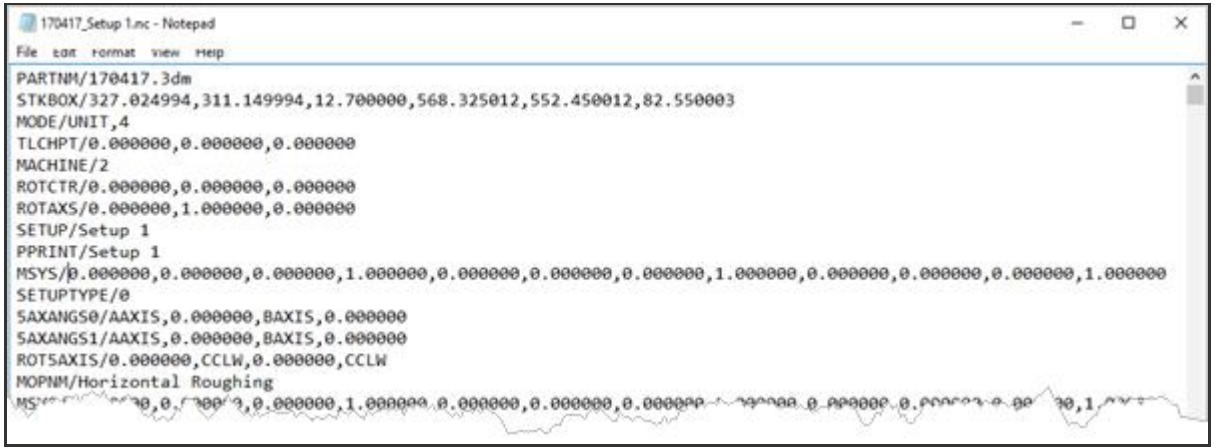


Here we see RhinoCAM's 3 Axis 3D Offset Pocketing toolpath. This toolpath maintains a constant 3D stepover distance regardless of the topology of the part surfaces. This toolpath is excellent for contoured surface machining because of the very high-quality finish that can be achieved.

RhinoCAM's APT CLS IJK Post Processor

Once Gordon has reviewed the toolpath definitions and cut material simulations in RhinoCAM, he then posts each Setup to an NC file using RhinoCAM's APT CLS IJK post processor.

RhinoCAM ships with over 200 post processors as well as its built-in prost processor generator. In Gordon's case, the APT post is used to interface with IRBCAM. Here is part of what the APT post file looks like for Setup 1:



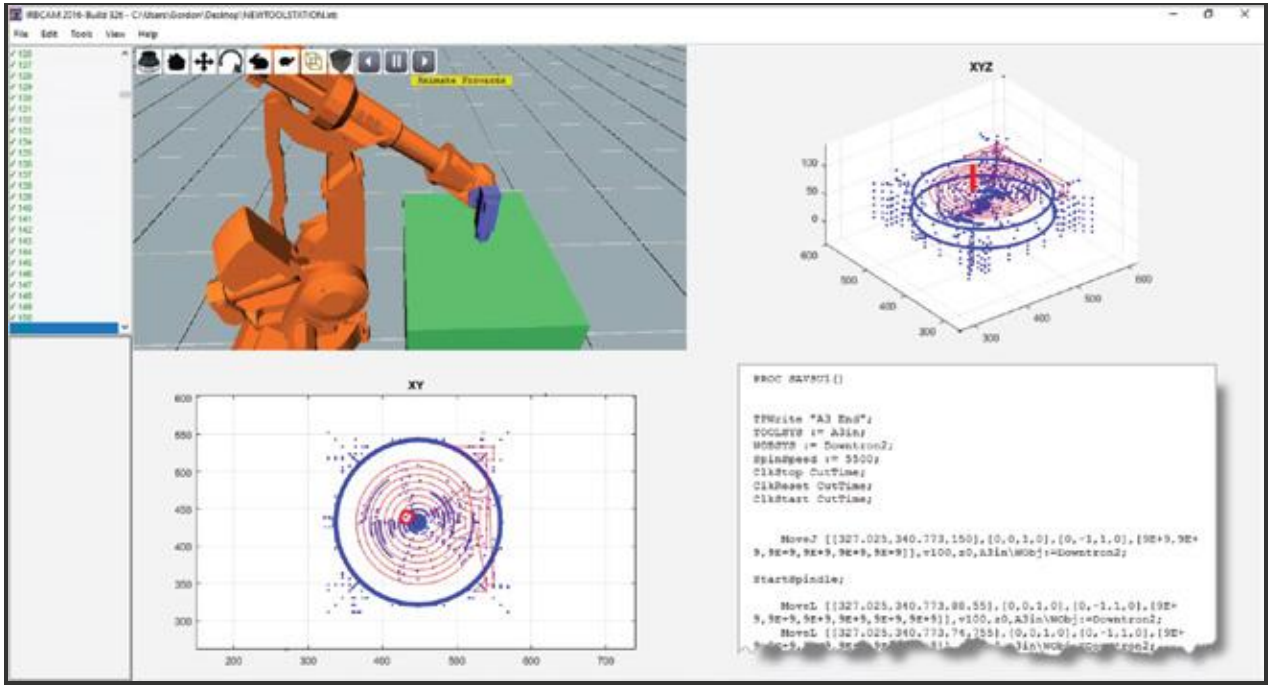
Sample NC file from RhinoCAM's APT CLS IJK post processor

I model all of my designs in Rhino because I find it to be a very intuitive CAD program. For this reason, RhinoCAM was a natural fit for us. We have the 3-5 Axis Premium configuration and find the interface to be very user friendly and the the learning curve to be very smooth.

Gordon Barnard, Designer + Engineer, Savsu technologies

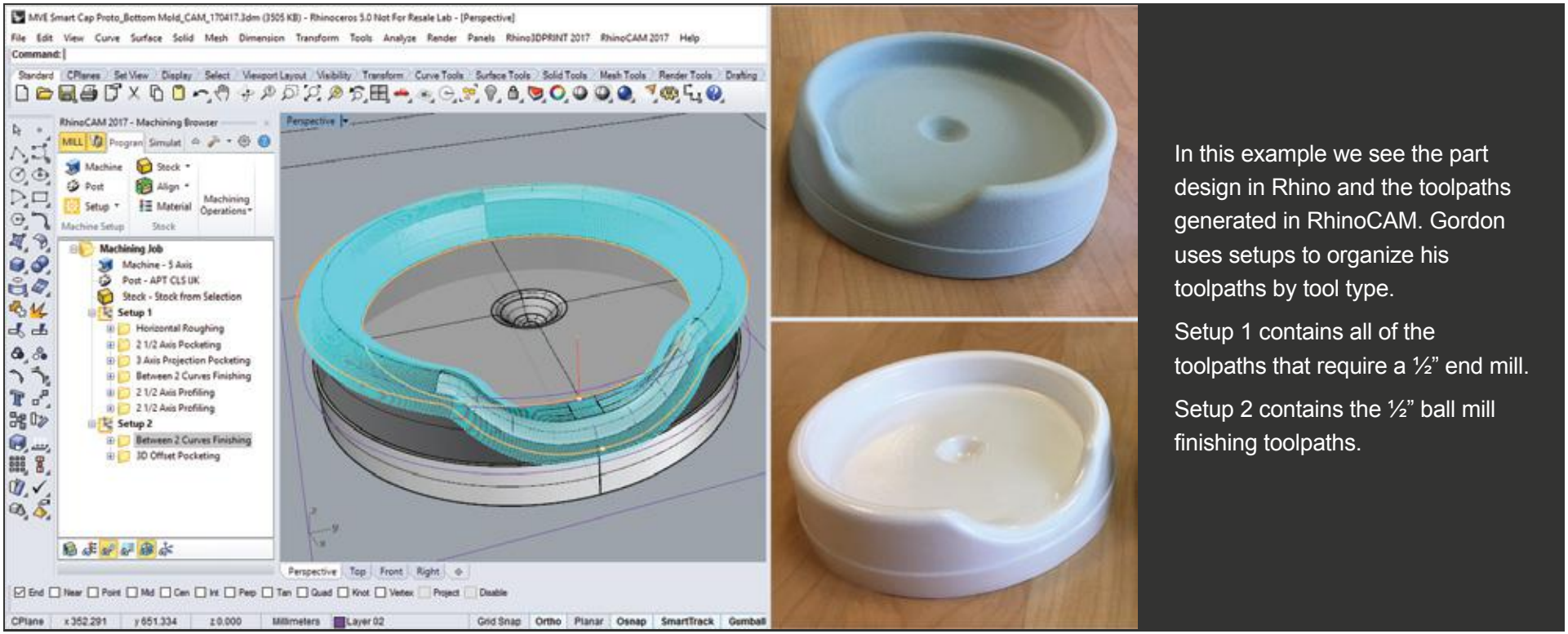
IRBCAM's Role

IRBCAM's role in this process is to read the APT post file from RhinoCAM, validate the motions and post the robot language code, called RAPID, for Gordon's ABB 4400 robot to cut the part. The image below illustrates this process. Here we see the combination view in IRBCAM showing the robot motion simulation view in the top left (the lines of APT code are listed on the very left). The remaining views show the motion plots in the XYZ planes. In the bottom right we have inserted a sample of the RAPID robot language text file that is posted from IRBCAM. This is the file that is sent to the robot to cut the part.



The Rapid Prototyping Results

Savsu Technologies uses Rhino, RhinoCAM, IRBCAM and their 6 Axis ABB 440 robot station to produce rapid prototype components for their smart packaging system designs is just hours! This means that Savsu engineers like Gordon can respond quickly to their customer's needs.



In this example we see the part design in Rhino and the toolpaths generated in RhinoCAM. Gordon uses setups to organize his toolpaths by tool type.

Setup 1 contains all of the toolpaths that require a ½" end mill.

Setup 2 contains the ½" ball mill finishing toolpaths.

More Images from Savsu Technologies

More about RhinoCAM

RhinoCAM is available in 5 different configurations (Express, Standard, Expert, Professional, and Premium). The part shown here was programmed using the Professional configuration. Here are some additional details about each of the available configurations. Click here for the complete features list.

- **RhinoCAM Express:** This is a general-purpose program tailored for hobbyists, makers, and students. Ideal for getting started with CAM programming. Includes 2 & 3 Axis machining methods.
- **RhinoCAM Standard:** This is a general-purpose machining program targeted at the general machinist. This product is ideal for the rapid-prototyping, hobby and educational markets where ease of use is a paramount requirement. Includes 2-1/2 Axis, 3 Axis, and drilling machining methods.
- **RhinoCAM Expert:** Includes the Standard configuration plus 4 Axis machining strategies, advanced cut material simulation, and tool holder collision detection.
- **RhinoCAM Professional:** Includes the Standard and Expert configuration plus advanced 3 Axis machining strategies, 5 Axis indexed machining, machine tool simulation, graphical toolpath editing and a host of other features.
- **RhinoCAM Premium:** Includes the Standard, Expert and Professional configurations plus 5 Axis simultaneous machining strategies.

To read more about RhinoCAM and other MecSoft Corporation products including screen images, resources, and features lists, please visit our Product page. You can also demo our products to take them for a test drive.

More about IRBCAM

IRBCAM supports over 250 robot models and can also be used as a stand-alone offline programming and verification tool, including singularity checking, robot configuration (bending backwards/forwards, elbow up/down and wrist flip/noflip, axis 6 +/- 360 degrees). You can purchase a RhinoCAM & IRBCAM bundle directly from MecSoft Corporation! For more information about IRBCAM, we invite you to visit them online at http://irbcam.com/. Also, here are some additional resources:

- IRBCAM Brochure
- IRBCAM Application Videos